

Precalc Warm Up # 9-3

1. Write the partial fraction decomposition for $\frac{-x}{x^2 + 3x + 2}$

2. Sketch. Label asymptote(s) and holes! $f(x) = \frac{4x^2 - 1}{2x^2 + 3x - 2}$

3. Sketch. Label asymptote(s) and holes! $f(x) = \frac{-x^3}{x^2 - 4}$

1. $\frac{-x}{x^2 + 3x + 2}$

$$2. f(x) = \frac{4x^2 - 1}{2x^2 + 3x - 2}$$

$$= \frac{(2x-1)(2x+1)}{(2x-1)(x+2)}$$

Vert: $x = -2$

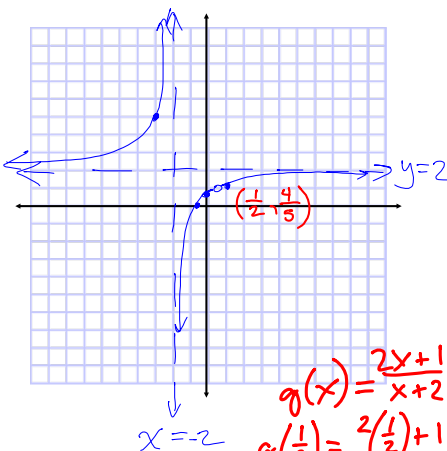
hole @ $x = \frac{1}{2}$

horiz: $y = 2$

x	y
-3	$\frac{35}{18-9-2} = \frac{35}{7}$
$-\frac{1}{2}$	0
0	$\frac{1}{2}$
1	$\frac{3}{3} = 1$

$$0 \rightarrow 0 = (2x-1)(2x+1)$$

$$x = \frac{1}{2}, -\frac{1}{2}$$



$$g(x) = \frac{2x+1}{x+2}$$

$$g\left(\frac{1}{2}\right) = \frac{2\left(\frac{1}{2}\right)+1}{\frac{1}{2}+\frac{2}{1}}$$

$$\frac{2}{\frac{5}{2}}$$

$$\frac{2}{1} \cdot \frac{2}{5}$$

$$\frac{4}{5}$$

$$3. f(x) = \frac{-x^3}{x^2 - 4}$$

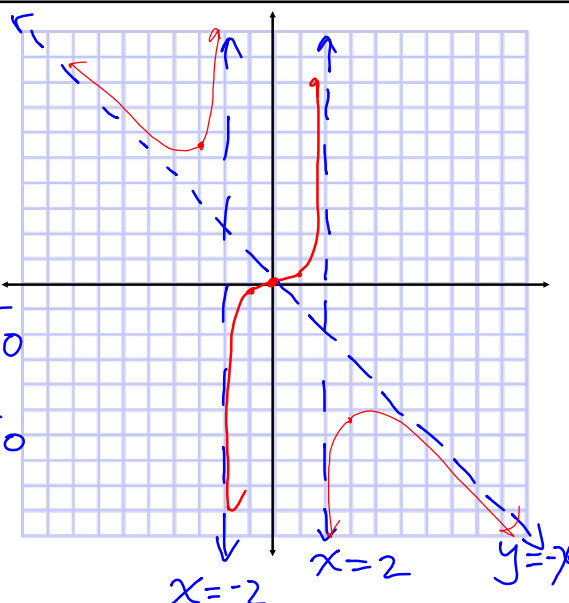
$$(x+2)(x-2)$$

Vert: $x = 2$ $x = -2$

$$\begin{array}{r} -x \\ x^2 - 4 \overline{) -x^3 + 0x^2 + 0x + 0} \\ -(-x^3 + 4x) \\ \hline -4x + 0 \end{array}$$

$y = -x$

x	y
-3	$\frac{-27}{5} = -5.4$
3	$\frac{-27}{5} = -5.4$
0	0
-1	$-\frac{1}{3}$
1	$-\frac{1}{3}$



In Exercises 1–36, write the partial fraction decomposition for the rational expression.

$$\boxed{3.} \frac{1}{x^2 + x}$$

$$\boxed{7.} \frac{3}{x^2 + x - 2}$$

$$\boxed{11.} \frac{x^2 + 12x + 12}{x^3 - 4x}$$

$$x(x+2)(x-2)$$

$$\frac{\quad}{x} + \frac{\quad}{x+2} + \frac{\quad}{x-2}$$

$$\boxed{13.} \frac{4x^2 + 2x - 1}{x^2(x+1)} = \frac{A}{x} + \frac{B}{x^2} + \frac{C}{x+1}$$

$$\boxed{19.} \frac{x^2 - 1}{x(x^2 + 1)}$$

Basic Eg:

$$4x^2 + 2x - 1 = A(x(x+1)) + B(x+1) + Cx^2$$

$$= \frac{A}{x} + \frac{Bx+C}{x^2+1}$$

$$\text{let } x = -1 \rightarrow 4 - 2 - 1 = C(-1)^2$$

$$1 = C$$

$$\text{let } x = 0 \rightarrow -1 = B$$

$$\text{let } x = 1 \rightarrow 5 = A(1)(2) - 1(2) + 1(1)^2$$

$$5 = 2A - 2 + 1$$

$$6 = 2A$$

$$A = 3$$

$$\boxed{\frac{3}{x} - \frac{1}{x^2} + \frac{1}{x+1}}$$

$$\frac{3}{x} - \frac{1}{x^2} + \frac{1}{x+1}$$

$$\boxed{23.} \left(\frac{x}{16x^4 - 1} \right) = \left(\frac{A}{2x+1} + \frac{B}{2x-1} + \frac{Cx+D}{4x^2+1} \right) \text{LCD}$$

$$(4x^2-1)(4x^2+1) \\ (2x+1)(2x-1)(4x^2+1)$$

Basic eq.

$$x = A(2x-1)(4x^2+1) + B(2x+1)(4x^2+1) + (Cx+D)(4x^2-1)$$

$$\text{Let } x = \frac{1}{2}$$

$$\text{Let } x = -\frac{1}{2}$$

$$\text{Let } x = 0$$

$$\boxed{27.} \frac{x^2 + 5}{(x+1)(x^2 - 2x + 3)}$$

$$\boxed{31.} \frac{x^4}{(x-1)^3}$$

$$\begin{array}{r} x^3 - 3x^2 + 3x - 1 \overline{) x^4 + 0x^3 + 0x^2 + 0x + 0} \\ \underline{-(x^4 - 3x^3 + 3x^2 - x)} \end{array}$$

$$\frac{x^4}{(x-1)^3} = x+3 + \frac{6x^2-8x+3}{(x-1)^3}$$

$$\begin{array}{r} 3x^3 - 3x^2 + x + 0 \\ \underline{-(3x^3 - 9x^2 + 9x - 3)} \\ 6x^2 - 8x + 3 \end{array}$$

Basic Eq: (Decompose the fraction part)

$$6x^2 - 8x + 3 = A(x-1)^2 + B(x-1) + C$$

$$\text{Let } x = 1 \dots$$

35. $\frac{1}{y(L-y)}, L \text{ is a constant} = \frac{A}{y} + \frac{B}{L-y}$

Basic Eq: $1 = A(L-y) + By$

Let $y=0 \rightarrow 1 = AL$

$A = \frac{1}{L}$

Let $y=L \rightarrow 1 = BL$

$B = \frac{1}{L}$

$\frac{\frac{1}{L}}{y} + \frac{\frac{1}{L}}{L-y}$

$\frac{1}{L} \cdot \frac{1}{y} + \frac{1}{L} \cdot \frac{1}{L-y}$

$\frac{1}{Ly} + \frac{1}{L(L-y)}$

Test PC Chapter 3 on Friday:

Quadratic Functions

Higher Degree Polynomials

Polynomial Long and Synthetic

Division

Real Zeros

Complex Numbers

Complex Zeros and factoring
completely

~~Graphing Rational Functions~~

Will be Group
Event tomorrow

~~Partial Fraction Decomposition~~

Will be Group
Event next week

Group Event tomorrow:
Graphing Rational Functions
without a graphing calculator.
Will count as a quiz.

HW: PC book

p. 246 (at the bottom of the page)

#1 - 69 e.o.o., and 47, 77

* This is the Lion's share of the review!
Tomorrow's assignment will be smaller.